

REMARKS

The Examiner has held that Claims 5, 6, 18, and 19 define patentable subject matter, and has rejected the remaining claims. New Claims 34-37 correspond, respectively, to original Claims 5, 6, 18, and 19, and are therefore believed allowable.

Applicants submit that the remaining claims are allowable for the following reasons.

An essential feature of the present invention is the use of narrow sensing pulses, wherein each sensing pulse begins substantially after the beginning of a half-cycle of the supply voltage. The present specification first mentions this feature on page 3, lines 18-21. A more detailed explanation of the choice of the start and stop points, for the sensing pulses, is given at page 14, line 26 through page 16, line 13. The specification also contains a detailed explanation of the advantages obtained from the above arrangement.

Claims 1, 14, and 31 have been amended to recite that the start point of the sensing pulse is located substantially after the zero-crossing point of the supply voltage. Claim 25 already contains this limitation, and therefore has not been amended. Claims 9 and 13 have been cancelled because they have become redundant in view of the above amendments.

Applicants submit that the pending claims define patentably over both cited references, for the reasons given below.

1. Shaw (U.S. Patent No. Re. 31,723)

The patent to Shaw shows a bridge circuit to which there is applied a sensing current and a heating current. The sensing current comprises a portion of the line current, reduced in voltage by resistor 25. The heating current comprises the full line current, which is selectively applied to the bridge by the switches shown in the circuit. In particular, when the silicon controlled rectifiers (SCRs) 21 and 23 are activated, they permit the full line voltage to appear across the bridge.

Applicants note that the Examiner has erroneously interpreted reference numerals 21 and 23 to be "Z1" and "Z3". Components 21 and 23 are not Zener diodes, but are silicon controlled rectifiers (see Shaw column 3, line 7).

Thus, the sensing current in Shaw is not provided as a pulse which is independent of the line voltage. Instead, the sensing current in Shaw has the same phase as the line voltage. The sensing current in Shaw is always applied; it is simply a reduced-amplitude version of the line signal.

Just as the line voltage of Shaw is sinusoidal, as indicated by waveform 28, the sensing current flowing through resistor 25 must also be sinusoidal. Even if a sinusoidal signal could be deemed a plurality of "pulses", each "pulse" by definition begins exactly at the zero-crossing point of the signal.

Therefore, the sensing current "pulses" in Shaw must begin exactly at the zero-crossing point, and cannot be substantially displaced from the zero-crossing point.

Thus, Shaw fails to teach or suggest a sensing current pulse, wherein the pulse begins at a point which is substantially after the zero-crossing point of the line voltage.

2. Chen (U.S. Patent No. 6,100,510)

The patent to Chen was cited by Applicants, and is discussed in the present specification. As explained on page 7, lines 13-16, the sensing pulse of the Chen circuit begins essentially at the beginning of each zero cross point. The present invention, intended as an improvement over Chen, provides pulses which begin substantially later.

In rejecting the claims over Chen, the Examiner has held that Chen discloses a circuit in which each start point of the sensing pulse is displaced from the beginning of a half-cycle of the supply voltage. In support of this rejection, the Examiner cites column 6, lines 41-66 of Chen. However, the Examiner has clearly misread Chen, because lines 65-66 state that "Q1 turns on at or near the beginning of the positive half-cycle, almost immediately after the zero-crossing".

Thus, Chen teaches a circuit in which the sensing pulse begins at or near the zero-crossing point of the supply voltage. Chen thus teaches a circuit which is entirely different from what is claimed here. Applicants submit that Chen fails to teach or suggest what is recited in the pending claims.

For the above reasons, Applicants submit that neither reference discloses or suggests the present claimed invention. Applicants submit that the application, as amended, is in condition for allowance. Applicants request reconsideration and early favorable action.